

4. (Amended) An integrated motor and magnetic bearing as claimed in claim 1, said integrated motor and magnetic bearing capable of providing simultaneously both rotational torque and bearing force.
7. (Amended) An integrated motor and magnetic bearing as claimed in claim 3, wherein at least one said sensor is selected from the group consisting of: an encoder, a Hall effect transistor, and a device adapted to measure a voltage generated at least one said coil segment.
9. (Amended) An integrated motor and magnetic bearing as claimed in claim 3, wherein said clearance gap is sized so as to provide vibration isolation.
10. (Amended) An integrated motor and magnetic bearing as claimed in claim 1, wherein at least one said motor segment is provided for fault tolerance.
17. (Amended) An integrated motor and magnetic bearing as claimed in claim 2, wherein said plurality of motor segments is at least three coil segments.
19. (Amended) An apparatus for manipulating a shaft comprising:
two integrated motor and magnetic bearing assemblies, each said assembly comprising a rotor and a stator, each said rotor comprising a plurality of permanent magnets, and each said stator comprising a plurality of independently controlled motor segments magnetically coupled to said permanent magnets, said motor segments adapted to produce tangential forces thereto, thereby producing both torque and bearing forces on said stator and said rotor from said tangential forces; and
a shaft;
wherein each said assembly is disposed along said shaft.
25. (Amended) A method for providing integral electromagnetic motor and bearing functions comprising: